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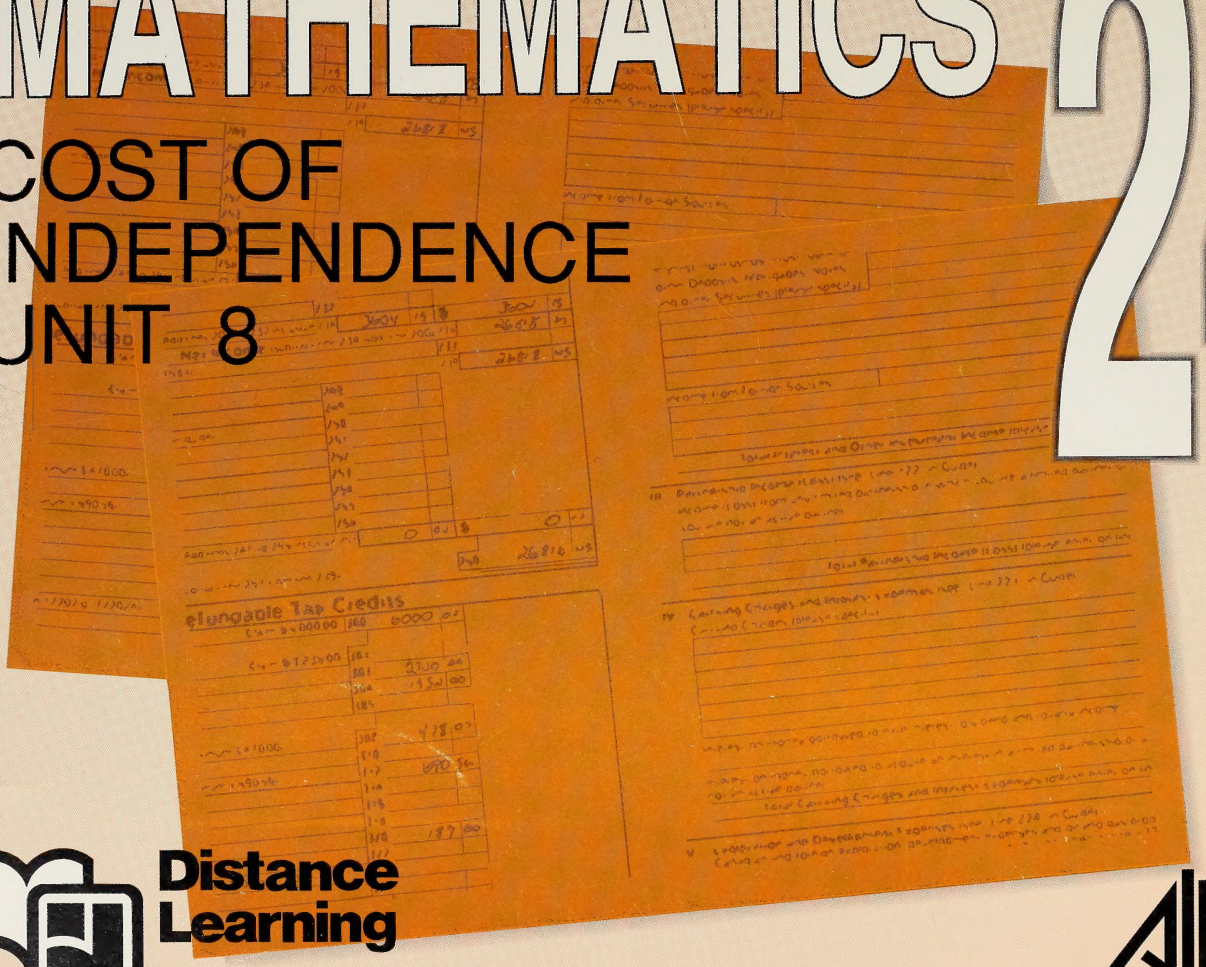
MATHEMATICS 24

COST OF INDEPENDENCE
UNIT 8



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Welcome

Distance Learning

You have chosen an alternate form of learning that allows you to work at your own pace. You will be responsible for your own schedule, for disciplining yourself to study the units thoroughly, and for completing your units regularly. We wish you much success and enjoyment in your studies.

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General Information

This information explains the basic layout of each booklet.

- **What You Already Know** and **Review** are to help you look back at what you have previously studied. The questions are to jog your memory and to prepare you for the learning that is going to happen in this unit.
- As you begin each **Topic**, spend a little time looking over the components. Doing this will give you a preview of what will be covered in the topic and will set your mind in the direction of learning.
- **Exploring the Topic** includes the objectives, concept development, and activities for each objective. Use your own papers to arrive at the answers in the activities.
- **Extra Help** reviews the topic. If you had any difficulty with **Exploring the Topic**, you may find this part helpful.
- **Extensions** gives you the opportunity to take the topic one step further.
- To summarize what you have learned, and to find instructions on doing the unit assignment, turn to the **Unit Summary** at the end of the unit.
- The **Appendices** include the solutions to **Activities (Appendix A)** and any other charts, tables, etc. which may be referred to in the topics **(Appendix B, etc.)**.

Visual Cues

Visual cues are pictures that are used to identify important areas of the material. They are found throughout the booklet.

An explanation of what they mean is written beside each visual cue.

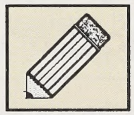
Key Idea
- flagging important ideas

Audiotape
- learning by listening to an audiotape

What You Already Know
- reviewing what you already know

Another View
- exploring different perspectives

Computer Software
- learning by using computer software



Review
- studying previous concepts

Solutions
- correcting the activities

Videotape
- learning by viewing a videotape

Introduction
- introducing the unit

Extra Help
- providing additional study

Print Pathway
- choosing a print alternative

What Lies Ahead
- previewing the unit

Extensions
- going on with the topic

Calculator
- using your calculator

Exploring the Topic
- actively learning new concepts

What You Have Learned
- summarizing what you have learned

Mathematics 24

Course Overview

Mathematics 24 contains 8 units. Beside each unit is a percentage that indicates what the unit is worth in relation to the rest of the course. The units and their percentages are listed below. You will be studying the unit that is shaded.

Unit 1 Work - Getting Paid	14%
Unit 2 Work - Income Tax	10%
Unit 3 Banking - Savings and Chequing Accounts	13%
Unit 4 Banking - Borrowing Money and Using Credit Cards	11%
Unit 5 Transportation - Owning a Vehicle	8%
Unit 6 Transportation - Travelling	8%
Unit 7 Accommodation	20%
Unit 8 **Cost of Independence**	**16%**
	100%

Unit Assessment

After completing the unit you will be given a mark based totally on a unit assignment. This assignment will be found in the Assignment Booklet.

Unit Assignment - 100%

If you are working on a CML terminal your teacher will determine what this assessment will be. It may be

Unit assignment - 50%
Supervised unit test - 50%

Introduction to Cost of Independence

This unit covers topics dealing with Cost of Independence. Each topic contains explanations, examples, and activities to assist you in understanding the cost of independence. If you find you are having difficulty with the explanations and the way the material is presented, there is a section called **Extra Help.** If you would like to extend your knowledge of the topic, there is a section called **Extensions.**

You can evaluate your understanding of each topic by working through the activities. Answers are found in the Solutions in the **Appendix.** In several cases there is more than one way to do the question.

Unit 8 Cost of Independence

Contents at a Glance

Value	Cost of Independence		3
	What You Already Know		5
	Review		5
32%	Topic 1:	Making a Budget • Introduction • Extra Help • What Lies Ahead • Extensions • Exploring Topic 1	6
24%	Topic 2:	Purchases • Introduction • Extra Help • What Lies Ahead • Extensions • Exploring Topic 2	19
11%	Topic 3:	Provincial Sales Tax • Introduction • Extra Help • What Lies Ahead • Extensions • Exploring Topic 3	28
33%	Topic 4:	Buying Life Insurance • Introduction • Extra Help • What Lies Ahead • Extensions • Exploring Topic 4	35
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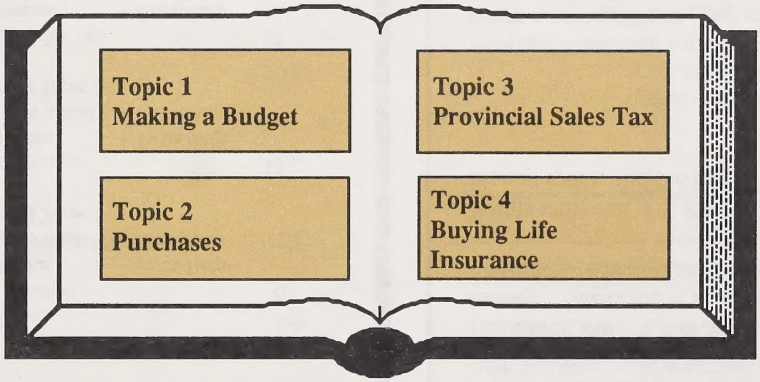
Cost of Independence

For some people, getting their earnings to match or exceed their spending is a difficult task. As a consumer, you make purchases, but are you always getting the most for your money? Insurance is an area where many people ask numerous questions. Are you one of them?

In this unit, you will look at budgeting, how to get value for money spent, and the basics of life insurance.

Unit 8

Cost of Independence



What You Already Know

Refresh your memory!

Do you remember how to do the following:

- Write decimals as percents.

  Move the decimal point two places to the right and add the % sign. For example, write 0.024 as a percent.

  $0.024 = 2.4\%$ (move)

- Write percents as decimals.

  Move the decimal point two places to the left and drop the % sign. For example, write 32.4% as a decimal.

  $32.4\% = 0.324$ (move)

- Write fractions as decimals or percents.

  Divide the numerator by the denominator. For example, write $\frac{2}{5}$ as a decimal or a percent.

  $\frac{2}{5} = 2 \div 5 = 0.4$

  $\therefore \frac{2}{5} = 0.4 = 40\%$

Now that you have looked at the material you studied previously, go to the **Review** to confirm your understanding of the material.

Review

Try the following review questions.

1. Write the following as percents.

   a. 0.372 b. 3.586

   c. 0.0013

2. Write the following as decimals.

   a. 32.7% b. 5.01%

   c. 0.023%

3. Write the following as percents and decimals.

   a. $\frac{1}{8}$ b. $\frac{3}{5}$

   c. $\frac{1}{20}$

Now go to the **Review** solutions in the **Appendix**. If you had difficulty with these questions, you may need to review Unit 1, Mathematics 14 called Ratio and Proportion.

Topic 1 Making a Budget

Introduction

Making a Budget

In this topic, you will examine all the aspects of a budget and what goes into the making of a budget. How would you go about making a budget sheet? You will learn how to do this as you work through **Topic 1.**

What Lies Ahead

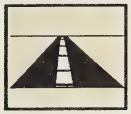
Throughout the topic you will learn how to

1. record estimated earnings and expenses
2. calculate individual expenses as percents of total expenses
3. set up and balance a budget

Now that you know what to expect, turn the page to begin your study of making a budget.

Exploring Topic 1

Activity 1



Record estimated earnings and expenses.

The reason for budgeting is to get your income to cover your expenditures. Most people have very few resources of income so the calculation for total income is relatively easy. It is merely adding your net money earned from your job with any other type of money you receive.

Some examples of other income are the following:

- a bonus from your job
- interest on investments
- family allowance
- prizes
- gifts
- refunds (bottles, medical, income tax, insurance, co-ops)

You may not want to include extra amounts earned by working an extra hour or two at the supermarket. If your income varies from one week to the next and you want to budget your income, then you have to keep a record of your income for a few months, and you will be in a better position to evaluate your financial position.

Note the example which shows how you can find your average monthly income.

$$\text{Average monthly income} = \frac{\text{sum of monthly incomes}}{\text{number of months}}$$

Example 1

Maurice Blackman was keeping records of his income for 5 months. What was his average monthly income?

May		June		July	
Salary	$1500	Salary	$1500	Salary	$1500
Pop Bottles	$ 15	Gift	$30		
	$1515		$1530		$1500

August		September	
Salary	$1600	Salary	$1600
Dividend	$ 50		
	$1650		$1600

Solution:

Find the sum of monthly incomes.
$1515 + $1530 + $1500 + $1650 + $1600 = $7795

Find the average monthly income.

$$\text{Average monthly income} = \frac{\text{sum of monthly incomes}}{\text{number of months}}$$

$$= \frac{\$7795}{5}$$

$$= \$1559$$

Maurice's average monthly income was $1559.

Money is just a number if you do not use it. If you want to use your money wisely, you need good planning. In planning your future spending, you should begin with your fixed expenses which requires the same amount to be paid each month. Some fixed expenses are rent, mortgage payments, car payments, and regular savings. Keep an itemized chart showing all the monthly fixed expenses.

This is an example of such a chart.

Monthly Fixed Expenses	
Rent	$350.00
Car payment	$150.00
Furniture payment	$ 59.00
Regular savings	$ 40.00
Emergency fund	$ 20.00
Total	$619.00

Each person has various types of expenses. The most common types of expenses are the ones which may change from month to month. These expenses are called variable expenses. Some variable expenses are food, clothes, entertainment, telephone, and gas.

To follow is a sample expense chart showing monthly variable expenses. It may be easier to fill in a chart like this than to just list the individual expenses.

Monthly Variable Expenses	
Food	$180.00
Clothes	$ 50.00
Gas, oil	$ 45.00
Gifts, contributions	$ 25.00
Entertainment	$ 30.00
Telephone	$ 18.00
Miscellaneous	$ 12.00
Total	$360.00

The following example shows you how to organize your spending records.

Fixed expenses are those you would have each month.

Variable expenses change from month to month.

Example 2

Maria is a student and has a part-time job. Her spending records for the four weeks in one month are shown below. Help her organize her spending records and find her total expenses for this month.

Week 1	
Gas	$15.00
Food	$ 6.50
Gifts	$20.00
Magazines	$ 1.50
Food	$ 7.00

Week 2	
Food	$ 7.00
Gas, oil	$37.00
Contributions	$ 3.00
Food	$ 7.50
Swimming	$ 2.50

Week 3	
Gas	$14.00
Food	$ 8.00
Movie	$ 8.50
Football game	$10.00
Food	$ 5.50

Week 4	
Food	$ 6.00
Stamps	$ 3.00
Magazines	$ 1.50
Bowling	$ 5.00
Food	$ 7.30
Gas	$14.20

Solution:

Maria classified her expenses according to the following categories.

- Food
- Gas, oil
- Entertainment, recreation
- Gifts, contributions
- Miscellaneous

Her monthly variable expenses chart is as follows:

Variable Monthly Expenses	
Food	$ 54.80
Gas, oil	$ 80.20
Entertainment, recreation	$ 26.00
Gifts, contributions	$ 23.00
Miscellaneous	$ 6.00
Total	$190.00

Since these are variable expenses, they change from month to month. You need to keep records for several months and calculate the average amount spent for each item. This average amount is what you use to prepare your budget. A sample chart is shown in which you calculate the average monthly amount spent for each item.

Monthly Variable Expenses in Dollars	Month 1	Month 2	Month 3	Average for budgeting
Food	$180.00	$175.00	$185.00	$180.00
Clothes	$ 50.00	$ 20.00	$ 32.00	$ 34.00
Gas, oil	$ 45.00	$ 43.00	$ 44.00	$ 44.00
Gifts, contributions	$ 25.00	$ 10.00	$ 5.00	$ 13.00
Entertainment	$ 30.00	$ 28.00	$ 32.00	$ 30.00
Telephone	$ 18.00	$ 20.00	$ 21.00	$ 20.00
Miscellaneous	$ 12.00	$ 8.00	$ 10.00	$ 10.00
Other				
Total				$331.00

To find the average for budgeting, divide the total of the three months by 3, and round the amount to the nearest dollar.

Another type of expense is the type which does not occur each month, but comes once during the year. These expenses are called **annual expenses**. Some annual expenses are taxes, insurance, and car registration.

In order to diminish the impact of a large bill that appears only once or twice during the year, money should be set aside each month to provide for the annual expenses.

$$\text{Monthly share} = \frac{\text{sum of annual expenses}}{12}$$

Example 3

Jenny has determined her annual expenses to be $485 for car insurance, $300 for car repairs, $285 for medical expenses, and $185 for tuition. What is her monthly share?

Solution:

$$\text{Monthly share} = \frac{\text{sum of annual expenses}}{12}$$

$$= \frac{\$485 + \$300 + \$285 + \$185}{12}$$

$$= \frac{\$1255}{12}$$

$$= \$104.58$$

The monthly share would be $104.58.

To better organize and categorize monthly expenses, it may be helpful to use an **expense chart**. It is usually a good idea to keep variable, fixed, and annual expenses separate in the chart.

This is an example of an expense chart.

Name:	Date:
Monthly Expenses	
Monthly Fixed Expenses	**Monthly Variable Expenses**
Rent or Mortgage.....$307.25	Food.....$340.50
Car payment 112.50	Household:
Instalment payments:	Electricity.....25.00
Furniture.....55.00	Heating fuel.....15.00
Appliances 43.00	Telephone.....12.00
	Water, garbage, sewer 18.00
Savings.....50.00	Other..... —
Other..... —	Transportation:
	Gas, oil 60.00
Total.....$567.75	Parking.....50.00
Annual Expenses	Commuting 12.00
Property tax.....$850.00	Other..... —
Car insurance.....850.00	Personal Spending:
Life insurance 90.50	Clothing.....30.00
Home insurance 92.00	Newspaper, etc.....14.00
License plates 30.00	Pocket money.....50.00
Other..... —	Entertainment:
	Movie/theatre.....7.50
Total $1912.50	Sports events.....15.00
	Recreation.....20.00
Reserved monthly	Dining out.....30.00
(divided by 12).....$159.38	Total $699.00
	Monthly Spending Plan
	Variable expenses.....$699.00
	Fixed expenses.....$567.75
	Annual expenses.....$159.38
	Total Monthly Expenses $1426.13

Now try the following questions.

Do at least two of the following three questions.

1. Linda pays $55.00 per week for rent. Her bus pass costs $35.00 per month. Her lunches cost $3.50 per day (5 days a week). Her car payment is $153.50 per month. Find Linda's total monthly fixed expenses in February (4 weeks).

2. Rylan pays $420.00 per month for rent and an average of $64.00 every two months for utilities. His car insurance is $540.00 per year. He pays $7.00 every two weeks for newspapers. Since Rylan is paid every week, he wants a weekly budget. Calculate his weekly fixed expenses. (Assume 1 month = 4 weeks, 1 year = 52 weeks.) (Round each answer to the nearest dollar.)

3. Carlo Rizzoli has the following annual expenses. Determine his monthly share.

Life insurance	$ 53.00
Home insurance	$120.00
Car insurance	$480.00
Property tax	$850.00

For solutions to **Activity 1**, turn to the **Appendix, Topic 1.**

Activity 2

Calculate individual expenses as percents of total expenses.

If you know the percent of earnings spent on each type of expense, you will be in a better position to prepare your budget. If you do not like the percent of earnings spent on a given item, you can change the percent of earnings spent on this item by changing the percent budgeted in relation to the net earnings. Use the new percent budgeted to find the new amount budgeted for this item. You should then be able to determine whether or not the new percent budgeted is practical. Study the following example.

Example 4

A family has a net income of $1500 a month. From the monthly expenses chart shown, determine the percent of earnings spent on each of these expenses.

Monthly Expenses	
Food	$250.00
Gas, oil	$ 45.00
Rent	$600.00
Clothing	$ 35.00

Solution:

Net income = denominator; expense = numerator

$$\text{Percent of total expenses} = \frac{\text{expense}}{\text{net income}} \times 100\%$$

$$\text{Food} = \frac{\$250}{\$1500} \times 100\% = \frac{25000}{1500}\% = 16.67\%$$

$$\text{Gas, oil} = \frac{\$45}{\$1500} \times 100\% = 3\%$$

$$\text{Rent} = \frac{\$600}{\$1500} \times 100\% = 40\%$$

$$\text{Clothing} = \frac{\$35}{\$1500} \times 100\% = 2.33\%$$

This family does not like to spend 40% of its net income for rent. They want to spend only 25%. What is the amount they should allot to this category?

$$\begin{aligned} 25\% \text{ of net income} &= 25\% \times \$1500 \\ &= \frac{25}{100} \times \$1500 \\ &= \frac{25 \times \$1500}{100} \\ &= \$375 \end{aligned}$$

If they want to spend 25% of their net income for rent, they should budget $375 for rent.

Try the following questions.

1. Zoe Sorensen has a net income of $2040.00 per month. She estimates the following variable expenses for her family.

Food	–	$120.00 per week
Gas, oil	–	$ 60.00 per month
Clothing	–	$500.00 per year
Donations	–	$ 5.00 per week
Car maintenance	–	$600.00 per year
Entertainment	–	$ 30.00 per month

   Express each item as a percent of the whole, correct to two decimal places. Calculate on a monthly budget.
   (1 year = 12 months; 1 month = 4 weeks)

2. The Jones family has a net income of $37 440.00 per year. They wish to allocate to each budget item the following percentages of their net income. Calculate each budget item for one month.

Item	Percent of Budget	Monthly Budget
Rent	24.0%	
Food	22.0%	
Utilities	4.0%	
Transportation	6.5%	
Clothing	4.8%	
Recreation	3.5%	
Personal expenses	3.5%	
Vacation	6.5%	
Savings	20.0%	
Insurance	5.2%	
Total	100.0%	

For solutions to **Activity 2**, turn to the **Appendix, Topic 1.**

If you had difficulty with these questions, you may want to try the **Extra Help** section, or you may want to try the following question.

Set up your own expense plan for a particular month. Use broad categories like the ones in questions 1 and 2. Be sure to find what percent of your net income each expense is. Then, answer the following questions.

- Which item uses the largest portion of your income? What percent is it?
- Which item uses the smallest portion of your income? What percent is it?
- If you made an expense plan for another month, would your expenses change? How?

Because this is an individual question, everyone's answers will be different. Thus, there are no solutions for this question in the **Appendix.** If you have difficulty with this question, you may contact your teacher.

Activity 3

Set up and balance a budget.

If you have records of your past income and expenditures, you can use them to prepare a monthly budget. In this way, you can budget for a large purchase in the future or just regular monthly expenses.

Example 5

Theresa Tornton has kept records for the last 6 months and completed the following chart. She wants to adjust the numbers to have $225.00 in savings to buy a new chesterfield in four months. The second chart shows her revised budget.

Theresa's original budget is as follows.

Budget Sheet (Monthly Expenditures)

Name: Theresa Tornton Date:

Fixed Monthly Expenses		Variable Monthly Expenses	
Rent or Mortgage	$425.00	Food	$230.00
Car payment	214.00	Household:	
Instalment payments		Electricity	45.00
Furniture	—	Heating fuel	52.21
Appliances	—	Telephone	17.85
	—	Water, garbage, sewer	—
Savings	—	Other	—
Emergency fund	65.00	Transportation:	
		Gas, oil	115.28
Total	$704.00	Parking	40.00
Annual Expenses		Commuting	—
		Other	—
Property tax	—	Personal Spending:	
Car insurance	463.50	Clothing	38.26
Life insurance	—	Newspaper/magazine	18.72
Renter's insurance	65.00	Pocket money	30.00
License plates	42.00	Gifts, contributions	35.00
Other	—	Entertainment:	
		Movie/theatre	6.50
Total	$570.50	Sports events	10.00
		Recreation	12.45
Reserved monthly (divided by 12)	$47.54	Dining out	26.49
		Miscellaneous	—
		Total	$677.76
		Monthly Spending Plan	
		Net Income	$1500.00
		Expenses:	
		Fixed expenses	$704.00
		Annual expense	47.54
		Variable expenses	677.76
		Total Monthly Expenses	$1429.30
		Balance	$70.70 (Savings)

Solution:

For her budget, she made the following changes.

- Fixed monthly expenses – She adds in the $225.00 she would like to save and decides that she can cut back the emergency fund from $65.00 to $30.00.
- Annual expense – Because she is not going to drive her car to work, her car insurance has been reduced to $310.00.
- Monthly variable expenses –

  Food – To allow for rising costs, she decided to round these figures up. She decided these figures could not be cut back.

  Transportation – Theresa decided to cut back here by buying a bus pass ($40.00) and using it for her major source of transportation.

  Personal Spending – She decided she could cut back here. (Clothing was reduced to $25, newspaper $12, pocket money $10, and gifts $10.)

  Entertainment – Again, Theresa thought that this was a place she could cut back. (Recreation was reduced to $8.00, and dining out $15.00.)

After cuts had been made, Theresa totalled the budget and found she could spend a few extra dollars. To make the expenditure and income balance exactly, she added $4.75 to the "pocket money" category which she had originally reduced to $10.00. The final figures for variable monthly expenses were adjusted, and the budget balanced.

Note: Because Theresa wanted to save $225.00 per month, she had to cut back on her expenses to accommodate this saving. In most cases, this is the procedure that people face when trying to save money. To save, you must cut expenses.

This is Theresa's revised budget.

Budget Sheet (Budgeted Expenditures)

Name: Theresa Tornton Date:

Fixed Monthly Expenses	
Rent or Mortgage	$425.00
Car payment	214.00
Instalment payments	
Furniture	——
Appliances	——
.....	——
Savings	225.00
Emergency fund	30.00
Total	$894.00

Annual Expenses	
Property tax	——
Car insurance	310.00
Life insurance	——
Renter's insurance	65.00
License plates	42.00
Other	——
Total	$417.00
Reserved monthly (divided by 12)	$34.75

Variable Monthly Expenses	
Food	$250.00
Household:	
Electricity	50.00
Heating fuel	60.00
Telephone	20.00
Water, garbage, sewer	——
Other	——
Transportation:	
Gas, oil	50.00
Parking	——
Commuting	40.00
Other	——
Personal Spending:	
Clothing	25.00
Newspaper/magazine	12.00
Pocket money	14.75
Gifts, contributions	10.00
Entertainment:	
Movie/theatre	6.50
Sports events	10.00
Recreation	8.00
Dining out	15.00
Miscellaneous	——
Total	$571.25

Monthly Spending Plan	
Net Income	$1500.00
Expenses:	
Fixed expenses	$894.00
Annual expenses	34.75
Variable expenses	571.25
Total Monthly Expenses	$1500.00
Balance	$0 (Savings)

Now you can do the following question.

1. The Oumets' budget is shown below.

Budget Sheet

Name: Graham and Catherine Oumet Date:

Fixed Monthly Expenses	
Rent or Mortgage	$520.00
Car payment	120.00
Instalment payments	
Furniture	56.00
Appliances	——
.....	——
Savings	200.00
Emergency fund	40.00
Total	$936.00

Annual Expenses	
Property tax	——
Car insurance	$410.00
Life insurance	32.00
Renter's insurance	86.00
License plates	32.00
Other	——
Total	560.00
Reserved monthly (divided by 12)	$46.67

Variable Monthly Expenses	
Food	$250.00
Household:	
Electricity	30.00
Heating fuel	25.00
Telephone	18.00
Water, garbage, sewer	30.00
Other	——
Transportation:	
Gas, oil	65.00
Parking	36.00
Commuting	——
Other	——
Personal Spending:	
Clothing	45.00
Newspaper/magazine	12.33
Pocket money	130.00
Gifts, contributions	19.00
Entertainment:	
Movie/theatre	12.00
Sports events	10.00
Recreation	17.00
Dining out	138.00
Miscellaneous	——
Total	$837.33

Monthly Spending Plan	
Net Income	$1820.00
Expenses:	
Fixed expenses	936.00
Annual expenses	46.67
Variable expenses	837.33
Total Monthly Expenses	$1820.00
Balance	$ 0

Catherine Oumet is going to university full-time. Catherine and Graham have to write a new budget according to the following changes.

- Increase the food expenses to $350.00 because Catherine has to eat at the cafeteria.
- Increase the gas/oil expenses $15.00 per month because Graham will have to drive farther to work.
- Increase the commuting expenses $32.00 per month because Catherine needs a bus pass.
- Cut $60.00 from the budget for pocket money.
- The rent for the new apartment on the university campus, including utilitites, will be $460.00 per month. (Utilities include electricity, heating fuel, and water, garbage, sewer.)
- The furniture will be paid for.
- No budget for dining out.
- Catherine's tuition, books, and other university expenses cost $2950.00 per year. (List the total costs under "Other". Students are allowed to pay their tuitions by instalments.)
- They do not need renter's insurance.
- Graham's salary remains the same. ($1820/month)
- All other expenses will remain the same.

Write a new budget for Cathy and Graham.

For solutions to **Activity 3**, turn to the **Appendix, Topic 1.**

If you require help, do the Extra Help section.

If you want more challenging explorations, do the Extensions section. } You may decide to do both.

Extra Help

Another way to find percentages is to use the ratio and proportion method. A ratio is like a fraction with a numerator and a denominator.

$$\text{Ratio} = \frac{\text{numerator}}{\text{denominator}}$$

When you were finding the percent of total expenses, you started with a ratio. It was as follows:

$$\frac{\text{expense}}{\text{net income}}$$ This is a ratio.

When two ratios are equal, this becomes a proportion. Some examples of proportion follow:

$$\frac{1}{2} = \frac{4}{8}$$

$$\frac{2}{15} = \frac{4}{30}$$

$$\frac{a}{b} = \frac{r}{100}$$

To calculate expenses as percents of total expenses, you may use the following proportion.

$$\frac{\text{expense}}{\text{net income}} = \frac{\text{percent of total expenses}}{100}$$

How can this proportion work? Follow along with this example.

Example 6

A family has a net income of $2100 per month. The total expenses come to a total of $1850. What is the percent of total expenses?

Solution:

Let r be the percent.

$$\frac{\text{expense}}{\text{net income}} = \frac{r}{100}$$ (Set up the proportion.)

$$\frac{\$1850}{\$2100} = \frac{r}{100}$$

$\$2100r = \$1850 \times 100$ (You may cross multiply here.)

$\$2100r = \$185\ 000$

$$\frac{\$2100r}{\$2100} = \frac{\$185\ 000}{\$2100}$$ (Divide both sides by 2100.)

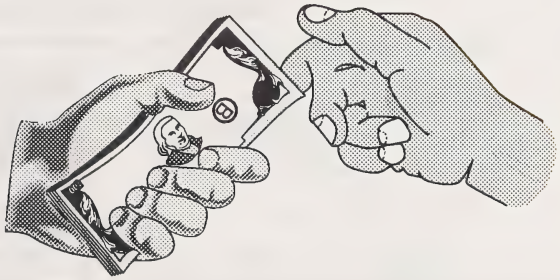
$r = 88\%$

This family spends 88% of its net income on expenses.

Now try the next question.

1. The Mullings family has a net income of $35 600 per year. Their expenses for the year come to $28 900. What percent of the total income is spent on expenses?

For solutions to **Extra Help**, turn to the **Appendix, Topic 1.**



Extensions

It has been mentioned that your expenses for food should be from 18% to 20% of your net income. Is this realistic?

Calculate your food expenses for a typical week or for the month. You will need to consider and add up the following:

- all items bought when shopping for food
- any junk food you have purchased
- anytime you have dined out, including just going for coffee with friends

When you have added up all these expenses, divide by the net income and multiply by 100.

$$\frac{\text{food expenses}}{\text{net income}} \times 100 = \text{percent of food expenses}$$

1. Are your food expenses within the range of 18 - 20%?

2. If you are over the range, where can you cut down to come within this range?

As this is an activity exercise, there are no solutions for it in the **Appendix**. If you have difficulty with it, you may contact your teacher.

Topic 2 Purchases

Introduction

In this topic, you will look at how to become a good consumer. For example, if turkey loaf is sold in two sizes, is the bigger container the better buy? The answer to this question will be discussed in Example 2.

What Lies Ahead

Throughout the topic you will learn how to

1. calculate and compare unit prices of similar items
2. calculate the sale price given the regular price and the discount (percent or fraction)
3. calculate the rate of discount given the regular price and the sale price
4. calculate the regular price given the sale price and the rate of discount

Now that you know what to expect, turn the page to begin your study of purchases.

Exploring Topic 2

Activity 1

Calculate and compare unit prices of similar items.

Unit Price

Everybody is a consumer, and everybody wants to be a wise one. When you purchase something, you want to get the most for your money. If you do not want to be misled by advertising gimmicks, you have to know how to calculate and compare the unit costs of items. Of course, information based solely on price is not good enough. Quality is also very important, but it is beyond the scope of this topic. Only price and discounts will be discussed. Unit cost is the cost per unit of measure or count. This unit can be a can, a dozen, a litre, and so on.

$$\text{Unit price} = \frac{\text{total price}}{\text{number of units}}$$

Example 1

Chocolate bars are on sale for 4 for $1.80. What is the price per chocolate bar to the nearest cent?

Solution:

$$\text{Unit price} = \frac{\$1.80}{4} = \$0.45$$

The price per chocolate bar is $0.45.

One cannot compare the unit costs of products if the units are not equal. A 500 gram jar of peanut butter for $2.50 is not cheaper than a 600 gram jar of peanut butter for $2.80. If you want to compare these two jars of peanut butter, you have to find the cost per gram of peanut butter. However, if you think the smaller jar of peanut butter tastes better and you are willing to pay more for it, then you are evaluating the quality of the peanut butter. While it is important to be able to judge quality, it is impossible to calculate quality. In this topic, you only deal with factors which can be calculated.

Example 2

Turkey loaf is sold in two sizes. The price of a 100 gram package is $1.50. The price of a 500 gram package is $7.25. Which is a better buy (based solely on price)?

Solution:

$$\begin{aligned}\text{Unit price for 100 g package} &= \$1.50 \div 100\,\text{g} \\ &= \$0.015/\text{g} \\ \text{Unit price for 500 g package} &= \$7.25 \div 500\,\text{g} \\ &= \$0.0145/\text{g}\end{aligned}$$

Therefore, the 500 g package is a better buy.

Now try a few questions.

Do either Part A or Part B.

Part A

Do at least two of the following three questions.

1. Ann purchases a 4 L box of laundry detergent for $5.20. Find the price per litre.
2. A 0.3 mL bottle of perfume costs $12.00. What is the price per millilitre?
3. Donuts are on sale for 18 for $3.60. Find the price per donut.

For solutions to **Activity 1**, turn to the **Appendix, Topic 2.**

Part B

For this exercise, you will be asked to go to a store, preferably a food store, and price out five different things. Choose items that come in different sizes. Record the price and size of the smaller-sized item and the price and size of the larger-sized item. When you get home, calculate the unit price, and try to determine whether it is more economical to purchase the smaller item or the larger item. Use the following chart.

Name of Item	Price of Smaller-sized Item	Size of Smaller Item	Unit Price	Price of Larger-sized Item	Size of Larger Item	Unit Price
1.						
2.						
3.						
4.						
5.						

Which size is the better buy? Why?

In the future which size will you choose? Why?

Is choosing the larger size always the best choice?

As this is an activity you have done on your own, there are no solutions in the **Appendix.** If you have difficulty answering these questions, you may wish to discuss this with your teacher.

Activity 2

Calculate the sale price given the regular price and the discount (percent or fraction).

Shopping at sales can sometimes bring you real bargains. Sale prices are usually lower than the regular retail price. When you purchase a product at a sale price, you save money. The money you save is called **discount** or markdown.

Markdown = discount
= regular retail price – sale price

Example 3

Aline Nadeau purchased a table at a sale price of $155.00. The regular retail price was $201.00. What was the discount?

Solution:

Discount = regular retail price – sale price

= $201.00 – $155.00

= $46.00

The discount was $46.00.

Sale Price

It is easy to find the discount given the regular price and the sale price. Sometimes businesses advertise the discount rate only. For example, a furniture shop may be selling all its furniture for 20% off the regular price, or $\frac{1}{3}$ off the regular price. You have to figure out the sale price or the discount yourself. This 20% is called discount rate, and the discount is the product of the regular price and the discount rate.

Discount = regular retail price × discount rate
Sale price = regular retail price – discount

Example 4

A T-shirt priced at $12.50 has been marked down 25%. Find the discount and the sale price to the nearest cent.

Solution:

Discount = regular price × discount rate

$= \$12.50 \times 25\%$

$= \$12.50 \times \frac{25}{100}$

$= \$3.125 = \$3.13$

The discount is $3.13.

Sale price $= \$12.50 - \$3.13$

$= \$9.37$

The sale price is $9.37.

Look at another example.

Example 5

A jacket priced at $186.00 has been marked down $\frac{1}{3}$ of the regular price. Find the discount and the sale price.

Solution:

$$\text{Discount} = \$186.00 \times \frac{1}{3}$$

$$\$186 \times \frac{1}{3} = \frac{\$186}{3}$$

$$= \$62$$

The discount is $62.00.

$$\text{Sale price} = \$186.00 - \$62.00$$

$$= \$124.00$$

The sale price of the jacket is $124.00.

Now complete the following questions.

Do at least three of the following four questions.

1. During the sale, ABC Lighting is selling all light fixtures for 25% off the regular price. Judy wants to buy a table lamp that regularly sells for $55.00. What is the sale price, and how much can Judy save?

2. The Friendly Toy Shop is selling all toys for $\frac{1}{3}$ off the regular price. George wants to buy a toy car that regularly sells for $25.20. Find the sale price.

3. Jill Briggs found the shelf price for bar soap was 3 bars for $0.98. Thrifty Mart had an in-house sale selling the bar soap for 5 bars for $1.68. Is the sale a bargain?

4. A lawn chair regularly sells for $13.50. J's store is selling it for $10.20. What is the discount?

For solutions to **Activity 2**, turn to the **Appendix, Topic 2.**

Activity 3

Calculate the rate of discount given the regular price and the sale price.

Discount Rate

A store may sell some merchandise at a lower price to attract customers or to get rid of the old stock. If the store has decided what the sale price should be, how do you calculate the rate of discount given the regular price and the sale price? The discount rate is a ratio. You divide discount by regular retail price and express your answer as a percent of the regular price.

$$\text{Discount rate} = \frac{\text{discount}}{\text{regular retail price}}$$

Look at the next example.

Example 6

A colour television which regularly sells for $250.00 is priced to sell at $190.00. What is the discount rate?

Solution:

Regular retail price = $250.00

Sale price = $190.00

Discount = $250.00 – $190.00 = $60.00

$$\text{Discount rate} = \frac{\$60.00}{\$250.00} = 0.24$$

Express 0.24 as a percent.

$0.24 \times 100\% = 24\%$

The discount rate is 24%.

If the discount rate is a fraction, the following example shows you how to express a fraction as a percent.

Example 7

Bathing suits had been marked down $\frac{1}{8}$ of the regular price. What was the percent of discount?

Solution:

$\frac{1}{8} = 0.125$

$0.125 \times 100\% = 12.5\%$

The discount rate is 12.5%.

Now try the following questions.

Do at least two of the following three questions.

1. Big Bull Hardware store is selling all the tools for $\frac{3}{8}$ off the regular price. Express the discount rate as a percent.

2. The regular selling price of a sweater is $18.00. The sale price is $15.00. What is the rate of discount?

3. A 500 gram package of cheese slices can be purchased for $1.80 after subtracting a 60¢ coupon. What is the discount rate if the coupon is used?

For solutions to **Activity 3**, turn to the **Appendix, Topic 2.**

Always multiply the decimal numeral by 100%, or simply move the decimal 2 places to the right.

Activity 4

Calculate the regular price given the sale price and the rate of discount.

Many retailers prefer to quote the sale price or the rate of discount because it sounds better. The sale price is always less than the regular price and is therefore more attractive. You, the customer, may want to find out what the regular price is. How?

To calculate the regular price given the sale price and the rate of discount, you have to find the percent which represents the sale price. Then, divide the sale price by this percent to find the regular price. Look at the following example.

Example 8

A bicycle is marked down 15% to a sale price of $65.00. What is the regular price?

Solution:

Sale price = $65.00
Discount rate = 15%

Sale price = (100% – 15%) of regular price
(This is always 100% because 100% represents the regular price.)

= 85% of regular price

$$\text{Regular price} = \frac{\text{sale price}}{85\%}$$

$$= \frac{\$65.00}{85\%}$$

$$= \frac{\$65.00}{0.85} \left(\frac{\$65}{0.85} = \frac{\$6500}{85} = \$76.47 \right)$$

$$= \$76.47$$

The regular price is $76.47.

Do the following questions.

1. A bicycle had been marked down 20%. The sale price was $88.00. What was the regular retail price?
2. A computer priced to sell at $180.00 was marked down $\frac{1}{3}$. How much was the regular price?

For solutions to **Activity 4**, turn to the **Appendix, Topic 2.**

or

$$\frac{\$65.00}{85\%} = \frac{\$65.00}{\frac{85}{100}}$$

$$= \$65.00 \div \frac{85}{100}$$

$$= \$65.00 \times \frac{100}{85} = \frac{\$6500}{85}$$

$$= \$76.47$$

If you require help, do the Extra Help section.

If you want more challenging explorations, do the Extensions section.

} You may decide to do both.

Extra Help

Discounts

Retail merchants occasionally have sales during which the prices on merchandise are reduced. The purpose may be to attract new customers, to make room for new merchandise, or to dispose of merchandise that is going out of date or out of season.

A discount is a reduction in the price of merchandise. It may be stated in cash or as a percent of the regular price. Remember to subtract the discount from the regular price to find the sale price of an item.

Example 9

An electric guitar is priced regularly at \$315 and is sold for \$265. How much is the discount?

Solution:

Regular price = \$315

Sale price = \$265

Discount = \$ 50

Example 10

Find the discount and the sale price of a refrigerator which regularly sells for \$800 and is sold at 25% off.

- Find the discount.

Solution:

Let N represent the discount on the refrigerator.
The proportion is

$$\frac{N}{\$800} = \frac{25}{100}$$

$$100N = 25 \times \$800$$

$$100N = \$20\ 000$$

$$N = \$20\ 000 \div 100$$

$$N = \$200$$

The discount on the refrigerator is \$200.

- Find the sale price.

Solution:

Regular price = \$800.00

Discount = \$200.00

Sale price = \$600.00

The sale price is \$600.00.

Now try the following questions.

1. Find the sale price of goods that regularly sell for $650 and are discounted by 40%.

   The regular price represents 100%.

   Since the rate of discount is 40% of the regular price, the sale price is 60% of the regular price.

   Let N represent the sale price.

   The proportion is as follows:

   $$\text{Solve for } N. \begin{cases} \frac{___}{100} = \frac{N}{\$650} \\ N = _____ \end{cases}$$

   The goods are priced at $ _____ .

2. A fur coat regularly sells for $750 and is sold for $525 during the spring clearance sale. Find what percent the discount is of the regular price.

   The discount is $ _____ – $ _____ or $ _____ .

   Let N represent the rate of discount.

   The proportion is as follows:

   $$\frac{_____}{} = \frac{N}{100}$$

   $$N = _____$$

   The discount on the coat was _____% of the regular price.

For solutions to **Extra Help**, turn to the **Appendix, Topic 2.**

Extensions

For this question, you must go to three different clothing stores. The objective of this is to determine whether the lowest price is always the best buy. Choose an item of clothing that is on sale. To help you determine the best buy, consider the following:

- Is the item of good quality?
- Is there any damage to the item?
- Will the item be in style for a short period of time, or long enough to wear in the future?

Complete the following chart:

Name of Item				
Name of Store	Regular Price	Discount	Sale Price	Describe the Quality
1.				
2.				
3.				

1. From which store would you purchase this item? Why?
2. Did you choose the one with the lowest selling price? Why?
3. Is it always wise to choose the lowest price?

As this is an individual question, the solution will not appear in the **Appendix.** If you have difficulty with this question, you may call your teacher.

Topic 3 Provincial Sales Tax

Introduction

When looking at the value of money spent, you must realize that in some provinces, sales tax is a fact of life. In this topic, you will examine sales taxes.

What Lies Ahead

Throughout the topic you will learn how to

1. identify and calculate the rate of provincial sales tax for different provinces and calculate the price of an item including provincial sales tax

Now that you know what to expect, turn the page to begin your study of provincial sales tax.

Exploring Topic 3

Activity 1

Identify and calculate the rate of provincial sales tax for different provinces and calculate the price of an item including provincial sales tax.

In Canada, all provincial governments, except Alberta, impose direct sales taxes on certain goods or services that you purchase. Sales taxes are added to the price of goods or services. Some municipalities also impose a retail sales tax. Sales taxes are collected by the retailers acting as agents of the government. Provincial sales taxes do not apply to goods sold for delivery in other provinces or other countries. The sales tax rate is expressed as a percent. The rates across Canada as of September 1988 are as follows:

BC	AB	SK	MB	ON	NS	PQ	NB	PE	NF
6%	0%	7%	7%	8%	10%	9%	11%	10%	12%

To calculate the sales tax, multiply the total selling price by the sales tax rate.

Sales tax = total selling price × sales tax rate

Example 1

Calculate the amount of the provincial sales tax to the nearest cent.

- A book is priced at $8.50. The sales tax is 7%.

Solution:

$$\text{Sales tax} = \$8.50 \times 7\%$$
$$= \$8.50 \times \frac{7}{100}$$
$$= \$0.595 = \$0.60$$

The sales tax is $0.60.

- A canoe is priced at $550.00. It is bought in Ontario.

Solution:

Sales tax rate = 8%

$$\text{Sales tax} = \$550.00 \times 8\%$$
$$= \$44.00$$

The sales tax is $44.00.

A sales slip is given to customers when they make a purchase. This is evidence of the purchase. The sales slip shows the quantity, description, unit price, total price for each item, total amount of sale, and sales tax (if any).

The following is an example of a sales slip.

Ontario		Department Store Toronto Date _____	
Quantity	Description	Price	Amount
1	Dress	$12.50	$12.50
3	Socks	$ 2.10	$ 6.30
1	Sweater	$ 9.70	$ 9.70
		Subtotal	$28.50
		Sales Tax	$ 2.28
		Total	$30.78

Sales tax rate = 8%

$$\$28.50 \times 8\% = \$28.50 \times \frac{8}{100}$$

$$= \$2.28$$

$\$28.50 + \$2.28 = \$30.78$

You calculate the total selling price first. Use the total selling price to calculate the sales tax. The total purchase price is the sum of the total selling price and the sales tax.

Total cost = total selling price + sales tax

Now try the following questions.

1. The price of a man's suit and a camera are given. Fill in the blanks stating what the sales tax would be in each province. Refer to the tax rates provided at the beginning of **Activity 1, Topic 3.**

Province	Sales Tax	
	Man's Suit $120.00	Camera $540.00
BC		
AB		
SK		
MB		
ON		
PQ		
NS		
PE		
NB		
NF		

2. Complete the sales receipt.

VANCOUVER BOOKSTORE, Vancouver, B.C. Date _____			
Quantity	Description	Price	Amount
5	Ballpoint pen	$ 0.37	
1	Book	$12.50	
2	Eraser	$ 0.20	
1	Art Supplies	$ 7.25	
	Subtotal		
	Sales Tax		
	Total		

3. At Best Buy Department Store, John purchased a pair of shoes for $46.00, a sweater for $10.00, 3 screwdrivers at $1.20 each, and a compact disc for $9.50. The sales tax rate is 9%. There is no sales tax charged on items of clothing. Find the total price of John's purchases.

For solutions to **Activity 1**, turn to the **Appendix, Topic 3.**

If you require help, do the Extra Help section.

If you want more challenging explorations, do the Extensions section. } You may decide to do both.

Extra Help

When a sales tax is imposed, a calculator is a very useful instrument when finding the exact cost of an item. Look at the following example.

Example 2

If you were in Quebec, you would be paying an additional 9% on items purchased. If you purchased a radio for $129.69, how much would you actually pay?

Solution:

Use a calculator to simplify the question.

Enter	Display	
129.69	129.69	
×		
.09	0.09	(9% expressed as a decimal is 0.09.)
=	11.6721	(Do not round at this step. If you do, your answer may be one cent off.)
+		
129.69	129.69	
=	141.3621	

The answer is rounded to two decimal places because money is normally expressed to two decimals. Thus, the final answer is $141.36.

In Quebec, you would pay $141.36 for a radio priced at $129.69.

Use this method to complete the following question.

Use your calculator to find the purchase price of the items after the sales tax is added.

Item	Sales Price	Sales Tax	Purchase Price
1. shoes	$ 49.99	5%	_____
2. suit	$159.99	3%	_____
3. flowers	$ 29.00	6%	_____

For solutions to **Extra Help**, turn to the **Appendix, Topic 3.**

Extensions

You can also use tables to find the sales tax of an item. In Unit 2, you became familiar with using the tables provided in the Income Tax Booklet called "Your Guide". The tax tables have been reproduced in this section of Unit 8 for your reference.

TAX TABLE A –

Column 1 Taxable Income (line 400) over	not over	Column 2 Federal Income Tax (line 401)	Column 1 Taxable Income (line 400) over	not over	Column 2 Federal Income Tax (line 401)	Column 1 Taxable Income (line 400) over	not over	Column 2 Federal Income Tax (line 401)
$12200	12210	$2075	$13200	13210	$2245	$14200	14210	$2415
12210	12220	2077	13210	13220	2247	14210	14220	2417
12220	12230	2078	13220	13230	2248	14220	14230	2418
12230	12240	2080	13230	13240	2250	14230	14240	2420
12240	12250	2082	13240	13250	2252	14240	14250	2422
12250	12260	2083	13250	13260	2253	14250	14260	2423
12260	12270	2085	13260	13270	2255	14260	14270	2425
12270	12280	2087	13270	13280	2257	14270	14280	2427
12280	12290	2088	13280	13290	2258	14280	14290	2428
12290	12300	2090	13290	13300	2260	14290	14300	2430
$12300	12310	$2092	$13300	13310	$2262	$14300	14310	$2432
12310	12320	2094	13310	13320	2264	14310	14320	2434
12320	12330	2095	13320	13330	2265	14320	14330	2435
12330	12340	2097	13330	13340	2267	14330	14340	2437
12340	12350	2099	13340	13350	2269	14340	14350	2439
12350	12360	2100	13350	13360	2270	14350	14360	2440
12360	12370	2102	13360	13370	2272	14360	14370	2442
12370	12380	2104	13370	13380	2274	14370	14380	2444
12380	12390	2105	13380	13390	2275	14380	14390	2445
12390	12400	2107	13390	13400	2277	14390	14400	2447
$12400	12410	$2109	$13400	13410	$2279	$14400	14410	$2449
12410	12420	2111	13410	13420	2281	14410	14420	2451
12420	12430	2112	13420	13430	2282	14420	14430	2452
12430	12440	2114	13430	13440	2284	14430	14440	2454
12440	12450	2116	13440	13450	2286	14440	14450	2456
12450	12460	2117	13450	13460	2287	14450	14460	2457
12460	12470	2119	13460	13470	2289	14460	14470	2459
12470	12480	2121	13470	13480	2291	14470	14480	2461
12480	12490	2122	13480	13490	2292	14480	14490	2462
12490	12500	2124	13490	13500	2294	14490	14500	2464

1

TAX TABLE B –

Column 1 Federal Tax (line 406) over	not over	Column 2 Individual Surtax (line 419)	Column 3 Basic Alberta Income Tax (form TIC-ALTA)	Column 1 Federal Tax (line 406) over	not over	Column 2 Individual Surtax (line 419)	Column 3 Basic Alberta Income Tax (form TIC-ALTA)
$2200	2202	$ 66	$ 1023.50	$2400	2402	$ 72	$ 1116.50
2202	2204	66	1024.40	2402	2404	72	1117.40
2204	2206	66	1025.30	2404	2406	72	1118.30
2206	2208	66	1026.30	2406	2408	72	1119.30
2208	2210	66	1027.20	2408	2410	72	1120.20
2210	2212	66	1028.10	2410	2412	72	1121.10
2212	2214	66	1029.00	2412	2414	72	1122.00
2214	2216	66	1030.00	2414	2416	72	1123.00
2216	2218	67	1030.90	2416	2418	73	1123.90
2218	2220	67	1031.80	2418	2420	73	1124.80
$2220	2222	$ 67	$ 1032.80	$2420	2422	$ 73	$ 1125.80
2222	2224	67	1033.70	2422	2424	73	1126.70
2224	2226	67	1034.60	2424	2426	73	1127.60
2226	2228	67	1035.60	2426	2428	73	1128.60
2228	2230	67	1036.50	2428	2430	73	1129.50
2230	2232	67	1037.40	2430	2432	73	1130.40
2232	2234	67	1038.30	2432	2434	73	1131.30
2234	2236	67	1039.30	2434	2436	73	1132.30
2236	2238	67	1040.20	2436	2438	73	1133.20
2238	2240	67	1041.10	2438	2440	73	1134.10
$2240	2242	$ 67	$ 1042.10	$2440	2442	$ 73	$ 1135.10
2242	2244	67	1043.00	2442	2444	73	1136.00
2244	2246	67	1043.90	2444	2446	73	1136.90
2246	2248	67	1044.90	2446	2448	73	1137.90
2248	2250	67	1045.80	2448	2450	73	1138.80
2250	2252	68	1046.70	2450	2452	74	1139.70
2252	2254	68	1047.60	2452	2454	74	1140.60
2254	2256	68	1048.60	2454	2456	74	1141.60
2256	2258	68	1049.50	2456	2458	74	1142.50
2258	2260	68	1050.40	2458	2460	74	1143.40
$2260	2262	$ 68	$ 1051.40	$2460	2462	$ 74	$ 1144.40
2262	2264	68	1052.30	2462	2464	74	1145.30
2264	2266	68	1053.20	2464	2466	74	1146.20
2266	2268	68	1054.20	2466	2468	74	1147.20
2268	2270	68	1055.10	2468	2470	74	1148.10
2270	2272	68	1056.00	2470	2472	74	1149.00
2272	2274	68	1056.90	2472	2474	74	1149.90
2274	2276	68	1057.90	2474	2476	74	1150.90
2276	2278	68	1058.80	2476	2478	74	1151.80
2278	2280	68	1059.70	2478	2480	74	1152.70

[1]

In Table A, column 1, the intervals are in increments of 10. The increments are of 2 in Table B, column 1. The amount in column 2 of Table A is obtained by taking 17% of the middle of the interval and rounding to the nearest dollar.

[1] Revenue Canada. All tables are reprinted with permission of the Minister of Supply and Services Canada.

For example, look at the interval $12 400 - 12 410 in Table A. The middle value is $12 405. If you multiply $12 405 by 0.17 (or 17%), the answer will be $2108.85. When rounded to the nearest dollar, the answer becomes $2109. This is the same amount that is listed in Table A, column 2 next to the interval $12 400 - 12 410.

Thus, you can see the advantage to using tables. With a quick glance, you can see the tax without having to perform any calculations.

Do you think you can make your own tax table? Try the next question.

1. If you worked at a retail store in Newfoundland, you would be required to charge a 12% sales tax on all items. If the store did not sell any items that cost more than $100, build a tax table using intervals of $5.

For solutions to **Extensions**, turn to the **Appendix, Topic 3.**

Topic 4 Buying Life Insurance

Introduction

Life insurance had its early beginnings when ship owners began to insure the lives of the ship's captain and crew. This way, for the duration of the voyage, ransom money would be available if the crew or captain were captured by pirates. The first life insurance policy was issued in 1583 in London, England. In this topic, you will examine the basic elements involved in purchasing life insurance.

What Lies Ahead

Throughout the topic you will learn how to

1. identify the benefits and limitations of life insurance
2. identify and compare features of types of life insurance such as term, whole-life, endowment, and group
3. identify factors such as the amount of insurance, age, sex, health, and employment of the person being insured which are used in determining the premium
4. identify and examine company projections of life insurance values including dividends, cash-surrender values, and loan amounts which can be borrowed against a policy

Now that you know what to expect, turn the page to begin your study of buying life insurance.

Exploring Topic 4

Activity 1

Identify the benefits and limitations of life insurance.

Insurance is a system whereby a number of individuals pay a relatively small amount of money to some company for a guarantee by that company that it will pay the individuals a much larger amount if they suffer a specific loss. Companies that offer insurance protection are called **insurance companies** or **assurance companies.**

Insurance can be purchased on a wide range of items. In this topic, you will deal only with insurance on a person's life. When people purchase life insurance, they pay money to the insurance company for a guarantee that the company will pay their heirs a sum of money in the event of their death.

There are variations in the types of life insurance that a person may purchase. However, the types of insurance offered by one company are quite similar to those offered by other insurance companies. An individual intending to purchase life insurance should carefully read the contract as the terms and conditions may vary from one company to another. Of course, the individual and the company are bound by the terms of their contract.

Traditionally, the husband in a family was the main wage earner, and he purchased life insurance on himself to provide his wife and family with some financial protection in the event of his death. This arrangement is still common today, but now people buy life insurance for other reasons.

Life insurance can also provide a savings program to provide money for education, to pay for a mortgage, or to add to your retirement income. However, the main purpose of life insurance is to protect your dependents financially in the event of your death.

Now try to identify some benefits and limitations of life insurance.

1. List some benefits of having life insurance.

2. Name some limitations of obtaining life insurance.

For solutions to **Activity 1**, turn to the **Appendix, Topic 4.**

Activity 2

Identify and compare features of types of life insurance such as term, whole-life, endowment, and group.

Types of Life Insurance

- Term life insurance can be bought for a specific term such as 1 year, 5 years, or to a specified age. You have to renew your policy at the end of each term. If you fail to renew your policy, the coverage ends. The insurance company keeps the entire premium no matter what happens. If you survive the length of the term, the insurance company pays nothing. The annual premium depends on your age when you buy the policy. The annual premium remains the same until the end of each term. Sometimes, it increases at each 5-year age bracket.

- Whole-life insurance affords protection as long as you live and pay your premium. The premium remains constant. It has a cash-surrender value or loan value. You may stop paying the premium and take a paid-up policy for a reduced amount or receive a certain amount (cash value) of money. A policyholder may borrow money from the insurance company. The loan value is usually equal to the cash value.

- Limited payment life insurance offers the same protection as the whole-life policy. It also has a cash-surrender value and a loan value. You pay premiums for a limited time only, usually 20 or 30 years or to some fixed age.

- Endowment life insurance offers financial protection for a certain number of years. If you survive the length of the term, you receive payment of the face value of the policy. It also has a cash-surrender value and a loan value.

- Group insurance offers the same protection as the term life insurance. If the group is made up of employees working for the same employer, the employer of the business organization often pays part of the premium. The premium is lower than other types of insurance. If an employee should quit working for the company, the coverage stops.

Which insurance policy would suit you best? To help you determine this, try the following activity.

Do either question 1 or 2.

1. If there is a life insurance company in your area, ask for more information on the various life insurance policies. Tell them that you are not there to purchase life insurance, but are seeking information for one of your assignments. Ask which policy would best suit you and why.

2. If you already have a life insurance policy, read it again and see which policy you have on yourself. Be sure to read the details.

As this is an individual question, there are no solutions in the **Appendix.** If you have questions about life insurance that you cannot answer, contact your teacher.

Activity 3

Identify factors such as the amount of insurance, age, sex, health, and employment of the person being insured which are used in determining the premium.

Life insurance premiums are paid annually, semiannually, quarterly, or monthly in advance. It is very easy to calculate the premium.

Premium = number of units purchased × premium per unit

The following table shows the annual premiums per $25 000 of 5-year term life insurance.

Age		Male	Female
Smoker	Nonsmoker		
	18-19	$ 66.00	$ 56.25
18-19	20-24	66.50	56.75
20-24	25-29	76.75	59.75
25-29	30-34	107.25	96.25
30-34	35-44	140.25	123.75
35-44	45-54	277.75	266.25
45-54	55-64	590.00	550.25
55-64	65	1069.25	885.50
65		2138.50	1771.00

The following examples show you how to use a table to determine the annual premium.

Example 1

Peter Duncan is a nonsmoker, 24 years old, and wants to purchase a $100 000, 5-year term life insurance policy. What is his annual premium?

Solution:

Number of units purchased = $100 000 ÷ $25 000 = 4

Premium per unit (refer to previous table) = $66.50

Annual premium = 4 × $66.50 = $266.00

The annual premium is $266.00.

Annual Premium Rates per $1000 Unit				
Age		Straight Life	20-payment Life	Endowment 20 Years
F	M			
18	15	$12.15	$18.52	$42.90
19	16	12.45	18.94	42.96
20	17	12.76	19.37	43.02
21	18	13.09	19.82	43.08
22	19	13.41	20.25	43.14
23	20	13.77	20.73	43.18
24	21	14.12	21.18	43.22
25	22	14.49	21.64	43.26
26	23	14.89	22.14	43.30
27	24	15.31	22.64	43.34
28	25	15.74	23.17	43.37
29	26	16.16	23.65	43.40
30	27	16.61	24.17	43.43
31	28	17.07	24.70	43.46
32	29	17.56	25.24	43.49
33	30	18.08	25.79	43.54

Example 2

Anita Kuzio, who is 30, wants to purchase a $50 000 whole-life (straight-life) insurance policy. Use the previous table to determine the annual premium. What is the total amount she will pay for the next 10 years?

Solution:

Number of units purchased = $50 000 ÷ $1000 = 50

Premium per unit = $16.61

Annual premium = 50 × $16.61 = $830.50

Total = $830.50 × 10 = $8305.00

You may wonder how the insurance companies establish the premium. Mathematicians, known as actuaries, work out the tables based on the life expectancy of various ages, sex, and other factors like employment, health, life-style (smoker or nonsmoker), leisure activities, and so on. Of course, they have to add operating cost, company profit, and reserve to the premium. People who participate in hazardous sports may have to pay a higher premium.

Now try the following questions.

Use the previous two tables to answer the questions.

1. a. John McLean is 20 years old. He is a smoker. He wants to buy a $50 000.00, 5-year term life insurance policy. What is his annual premium? What is the total amount he will pay for the next five years? If he wants to renew his policy five years later, what is his annual premium?

   b. If John McLean dies at age 23, how much will his beneficiary receive? What is the total amount he has paid for this policy in 3 years?

2. Maxine Oko is 25 and a nonsmoker. She wants to purchase a 5-year term life insurance policy (sold in multiples of $25 000). How much insurance can she buy for $192.50 per annum?

3. Fill in the blanks in the following chart.

	Policy	Age	Sex	Face Value	Premium
a.	Straight-life	23	M	$ 3000.00	_____
b.	Straight-life	31	F	$20 000.00	_____
c.	Straight-life	30	M	_____	$ 54.24
d.	20-payment life	18	F	$ 6000.00	_____
e.	20-payment life	19	M	$ 8000.00	_____
f.	20-payment life	20	F	_____	$ 77.48
g.	20-year endowment	26	M	$10 000.00	_____
h.	20-year endowment	25	F	$ 7000.00	_____
i.	20-year endowment	27	M	_____	$217.15

For solutions to **Activity 3**, turn to the **Appendix, Topic 4.**

Activity 4

Identify and examine company projections of life insurance values including dividends, cash-surrender values, and loan amounts which can be borrowed against a policy.

Cash-surrender Value and Loan Value

Besides providing financial protection in case of death, whole-life (straight-life), limited-payment life and endowment life insurance policies also have a cash-surrender value and a loan value. The following table shows the cash-surrender values for a life insurance policy.

Cash-surrender value and loan value for $1000 life insurance

Age		Number of years premium paid				
M	F	5 years	10 years	15 years	20 years	at age 65
		Whole Life				
20	25	$ 23.13	$ 72.06	$129.41	$195.39	$578.17
25	30	31.12	89.99	157.68	232.98	559.91
30	35	41.00	111.28	189.38	274.40	536.34
35	40	52.52	134.70	224.04	318.60	505.54
40	45	64.68	160.22	261.17	365.08	465.27
45	50	78.38	188.16	300.93	412.82	412.82
50	55	93.11	218.08	341.81	458.52	341.81
55	60	109.43	249.28	380.81	500.29	249.28

Cash-surrender value and loan value for $1000 life insurance

Age		Number of years premium paid				
M	F	5 years	10 years	15 years	20 years	at age 65
		20-payment				
20	25	$ 54.09	$141.66	$245.50	$367.88	$670.45
25	30	64.80	165.75	284.36	422.32	670.45
30	35	77.20	192.87	326.57	481.36	670.45
35	40	90.76	221.34	370.98	543.61	670.45
40	45	104.07	250.13	415.79	607.41	670.45
45	50	117.38	278.29	459.31	670.45	670.45
50	55	129.71	304.34	498.74	724.62	489.74
55	60	141.49	327.14	530.59	783.11	327.14
M	F	20-year Endowment				
20	25	$167.94	$397.27	$671.73	$1000.00	
25	30	167.88	397.39	671.60	1000.00	
30	35	168.17	397.79	671.08	1000.00	
35	40	168.58	397.51	669.72	1000.00	
40	45	168.10	396.19	666.93	1000.00	
45	50	167.82	394.23	662.70	1000.00	
50	55	167.35	391.43	656.26	1000.00	
55	60	166.86	387.63	646.28	1000.00	

Use the previous table to determine the cash-surrender value of an insurance policy.

Example 3

Don Yee is 35. He wants to buy $50 000.00 worth of insurance which has the largest cash-surrender value. He plans to retire when he is 55. What kind of insurance should he purchase? Compare the cash values when Don is 55.

Solution:

Number of units = $50 000.00 ÷ $1000 = 50

From the table, the cash value of each policy follows:

- 20-year whole life = $318.60 × 50 = $15 930.00.
- 20-payment life = $543.61 × 50 = $27 180.50.
- 20-year endowment = $1000 × 50 = $50 000.00.

Therefore, Don should purchase 20-year endowment life insurance.

Dividends

An insurance company is similar to any other company in that it intends to make a profit on its yearly operations. Such profits are normally shared amongst the shareholders of that company, but in the case of insurance companies, the people holding certain policies can also be given a share of the profits. This share of profits is called a **dividend**, whether it is given to a shareholder in the company, or to a holder of an insurance policy with the company.

A person holding an insurance policy that pays dividends is said to have a participating policy, since that person participates in the sharing of the company's profits.

As with the dividends of any company, the amount of each year's dividend depends upon the profit made by the company in that year, as well as upon the total number of people sharing the profit. Dividends can, therefore, vary considerably from one year to the next.

Procedures with regard to dividends vary from company to company, and even from policy to policy within one company.

Various options of dealing with such dividends include the following:

- You can take the dividends in the form of cash.
- You can use it to pay part of your premium.
- You can leave the dividends with the insurance company, and it will pay you interest.
- You can buy paid-up additions. The face amount depends on your age and the duration of the coverage.
- You can buy additional term insurance which would have no cash value.
- You can buy some additional term insurance and leave some dividend dollars to earn interest.

Example 4

José was 22 when he bought 5 units of $1000.00 each of whole-life insurance. It was a participating policy. During the first 4 years José had his policy, the insurance company declared the following yearly dividends per unit: $8.75, $5.53, $6.05, and $7.20. What is the total amount of dividends he has received in 4 years?

Solution:

$(\$8.75 + \$5.53 + \$6.05 + \$7.20) \times 5 = \$137.65$

José would receive a total of $137.65 in dividends.

Example 5

If José (Example 4) chose to apply the dividends to the yearly premium, (dividends are only applied at the end of each year's business), find the first 4 premiums José would have to pay.

Solution:

1st premium = (Use table given in Example 2.)

$\$14.49 \times 5 = \$72.45$

2nd premium $= (\$14.49 - \$8.75) \times 5 = \$28.70$

3rd premium $= (\$14.49 - \$5.53) \times 5 = \$44.80$

4th premium $= (\$14.49 - \$6.05) \times 5 = \$42.20$

To test your understanding, complete the following questions.

1. Henry Kiel bought $9000 worth of whole-life insurance when he was 20 years old. What will be the cash-surrender value of this policy when he is 35? What will be the cash value of this policy in 5 years?

2. Carl Horn is 20. He wants to buy $3000.00 worth of 20-payment life insurance. Find the cash-surrender value of the policy and the total amount he has paid for this policy in 15 years.

3. Gaylene was 25. She bought $20 000.00 ($1000.00 per unit) of a 20-year endowment life insurance policy which was a participating policy. The insurance company declared the following yearly dividends per unit during the first 4 years she had her policy: $10.20, $9.56, $9.00, and $11.30. Gaylene chose to apply the dividends to the yearly premium. Find the first 5 premiums she would have to pay.

For solutions to **Activity 4**, turn to the **Appendix, Topic 4.**

If you require help, do the Extra Help section.

If you want more challenging explorations, do the Extensions section. } You may decide to do both.

Extra Help

Here is a quick review of some terms used in life insurance.

Terms Used in Life Insurance

The **insurer** is the life insurance company.
The **insured** is the person whose life is insured.
The **policy** is the contract between the insurer and the insured.
The **beneficiary** is the person to whom the benefits are payable.
The **premium** is the amount paid regularly to the company for the protection.

Types of Policies

Term Life Insurance

- This is temporary insurance.
- It gives protection for a fixed period of 1, 5, 10, or 20 years, or to a specified age.
- It has the lowest premium rates.
- It pays the beneficiary the face value of the policy only if the insured dies during the term of the policy. That is, if the insured survives the length of the term, the insurance company keeps the entire premium and pays nothing.

Whole-Life Insurance (also called straight-life or ordinary-life)

- This insurance provides lifetime protection.
- It has premiums that are payable until death or age 99.
- It has a savings or cash value feature.
- It pays the beneficiary the face value of the policy at the time of the insured person's death.

Limited Payment Life Insurance

- This insurance limits the payment of premiums to a fixed period such as 20 or 30 years (called a 20-payment life policy or a 30-payment life policy), or up to a certain age such as 60 or 65.
- It provides lifetime protection.
- It pays the beneficiary the face value of the policy when the insured dies.
- It costs more than whole-life because the premium-paying period is limited.

Endowment Insurance

- This insurance limits the payment of premiums to a fixed period, such as 20 years.
- It provides protection for the fixed period.
- It pays the insured the face value of the policy at the end of the fixed period.
- It pays the beneficiary the face value of the policy in the event of death of the insured during the fixed period.
- It costs more than whole-life or limited payment life due to larger savings element (the fact the insured may also benefit).

Group Life Insurance

- When employees of a company obtain life insurance under a master policy covering the entire group, the insurance is known as group life insurance. The premium per person is usually less than that for a policy of similar amount taken out individually by each member of the group. The employer often pays part or all of the premiums. Accident and health, and hospitalization insurance can also be obtained under a group plan.

Premium Rates

The cost of life insurance depends on several factors:

- your age when the policy is written

  older person → shorter life expectancy → higher premium

- the kind of policy you choose

  higher return → higher premium

- the amount of the policy you choose (the face value)

  larger policy → larger premium

The table that follows shows the annual rates charged by one large insurance company for $1000 of life insurance under several types of policies taken out at various ages.

Annual Premium for $1000 Insurance

Age at Issue	Straight-Life	20- Pay Life	20- Year Endowment	20- Year Term
20	$13.80	$24.90	$46.06	$ 4.41
25	15.75	27.18	46.16	4.85
30	18.16	29.84	46.38	5.85
35	21.42	33.08	46.96	7.60
40	25.57	36.87	48.08	10.21
45	31.01	41.55	49.66	14.85
50	37.96	47.08	52.62	21.87

To find the premium for amounts other than $1000, multiply the rate in the table by the number of thousands in the face of the policy.

For example, for a $2500 policy the premium would be $\frac{\$2500}{\$1000}$ or 2.5 times the rate shown in the table.

Remember, when calculating premiums, you must consider the following points:

- kind of policy
- age at issue
- face value of the policy

Do the following questions using the rates given in the previous table.

In question 1, the first answer is provided to show you how to use the premium table.

Locate the column giving straight-life rates. Then, in the row showing rates for 30-year-olds, go along the row until you come to the appropriate rate in the Straight-Life column.

1. Find the annual premium for each of the following policies.

Kind of Policy	Age at Issue	Face of Policy	Calculation of Premium	Premium
Straight-Life	30	$7000	$\frac{\$7000}{\$1000} \times \$18.16$	$127.12
Straight-Life	45	$5000	$\frac{\$5000}{\$1000} \times$ ___	
20-Payment Life	20	$8500	$\frac{\quad}{\$1000} \times$ ___	
20-Year Endowment	25	$5500	$\frac{\quad}{\$1000} \times$ ___	
20-Year Term	45	$6000	___ × ___	

2. How much more is the annual premium on a 20-year endowment policy for $5000 at age 20 than on a straight-life policy?

3. At age 40, John Gould took out a 20-year endowment policy for $5000. Twenty years later, the policy matured, and he received $5000 in cash from the insurance company. How much more was the amount he received than the total of the premiums he had paid?

4. When he was 35 years old, Roger Clearwater took out a straight-life policy for $10 000. He died after making 16 annual payments, and the insurance company then paid the beneficiary the amount of the policy. How much more did the beneficiary receive than the total amount that had been paid to the company in premiums?

For solutions to **Extra Help**, turn to the **Appendix, Topic 4.**

Extensions

Buying Fire Insurance

Fire Insurance and Extended Coverage

Often, when you hear, "Part of Emilio Zuko's house was destroyed by fire last night," the first question people ask is, "How well was it insured?" The reason for this is that the replacement value of a house and possessions can be very costly. If there is inadequate insurance, most people would find themselves in a very bad situation if they were faced with, for example, a $20 000 loss.

Protection against loss by fire can be obtained from a fire insurance company at a nominal cost. Due to the present inflationary economy, fire insurance policies can only be purchased for a one-year period. The premium for the whole term must be paid when the insurance is purchased. For a small additional premium, extended coverage can be obtained. This is additional insurance which includes protection against loss from such causes as windstorm, lightning, hail, rain, water, smoke, falling aircraft, and explosion.

Premium Rates

Premium rates are usually based on $100 units of insurance (coverage). For example, if the amount rate on a person's house is $0.48 per $100 and it is insured for $28 000, you can calculate the premium for one year.

Number of $100 units in $28 000 is $\frac{\$28\ 000}{\$100} = 280.$

Amount of premium for one year $= 280 \times \$0.48$

$= \$134.40$

Now try the following questions.

1. Find the premium for one year in each of the following:

Face of Policy	Annual Rate	Calculation of Annual Premium	Annual Premium (to the nearest cent)
$ 9000	$0.39	$\frac{\$9000}{\$100} \times \$0.39$	
$12 000	$0.56	$\frac{\quad}{\$100} \times \frac{\quad}{\quad}$	
$22 000	$0.45	$\quad \times \frac{\quad}{\quad}$	
$61 000	$0.37	$\quad \times \frac{\quad}{\quad}$	

2. A house valued at $42 000 is insured annually for 80% of its value at 51¢ per $100. What is the amount of the annual premium?

For solutions to **Extensions**, turn to the **Appendix, Topic 4.**

Unit Summary

What You Have Learned

A budget is a plan for spending. Earnings and expenses may vary from month to month. You use the average amounts to prepare your budget. You prepare an expense chart first. If you do not like the way you spend your money, then you make changes which would appear in your new budget. You always make adjustments so that the balance is 0.

If you want to be a smart consumer, you have to know how to compare prices. Unit price is the first thing you want to compare. Shopping at sales can bring you real bargains. If you want to find out whether it is a real bargain or not, you have to calculate the sale price or the discount. Sometimes you may want to know the rate of discount or even the regular price.

The formulas you use are as follows:

- Unit price $= \dfrac{\text{total price}}{\text{number of units}}$
- Discount = regular price − sale price
- Discount rate $= \dfrac{\text{discount}}{\text{regular price}}$
- Regular price $= \dfrac{\text{sale price}}{(100\% - \text{discount rate})}$

Most provincial governments impose sales tax on certain goods or services you purchase. To calculate the sales tax, you multiply the total selling price by the sales tax rate.

Unit Summary

Life insurance protects your dependents financially in the event of your death. There are different kinds of life insurance.

- Term life insurance
- Whole-life insurance (straight-life)
- Limited payment life insurance
- Endowment life insurance
- Group life insurance

Some of them provide a saving program as well as financial protection. Insurance premiums are based on age, sex, employment, health, life-style, and so on. You should read the insurance contract carefully before you sign it.

You are now ready to

complete the **Unit Assignment.**

Appendix

Solutions

Review

Topic 1 Making a Budget

Topic 2 Purchases

Topic 3 Provincial Sales Tax

Topic 4 Buying Life Insurance

Review

1. a. $0.372 = 37.2\%$ (move)

   b. $3.586 = 358.6\%$ (move)

   c. $0.0013 = 0.13\%$ (move)

2. a. $32.7\% = 0.327$ (move)

   b. $5.01\% = 0.0501$ (move)

   c. $0.023\% = 0.00023$ (move)

3. a. $\frac{1}{8} = 0.125 = 12.5\%$

   b. $\frac{3}{5} = 0.6 = 60\%$

   c. $\frac{1}{20} = 0.05 = 5\%$

Exploring Topic 1

Activity 1

Record estimated earnings and expenses.

1. Rent = \$55/week = \$220/month
   Bus pass = \$35/month
   Lunches = \$3.50/day = \$3.50 × 5/week = \$3.50 × 20/month
   = \$70/month
   Car payment = \$153.50/month
   Total monthly fixed expenses = \$220 + \$35 + \$70 + \$153.50
   = \$478.50
   Linda's total monthly fixed expenses are \$478.50.

2. Rent = \$420/month = \$420 ÷ 4/week = \$105/week
   Utilities = \$64/two months = \$64 ÷ 8/week = \$8/week
   Car insurance = \$540/year = \$540 ÷ 52/week = \$10.38/week
   Newspaper = \$7/two weeks = \$3.50/week
   Total weekly expenses = \$105 + \$8 + \$10.38 + \$3.50 = \$126.88
   Rylan's weekly fixed expenses are \$126.88.

3. Total annual expenses = \$53 + \$120 + \$480 + \$850 = \$1503.00

   $$\text{Monthly share} = \frac{\$1503.00}{12} = \$125.25$$

   Carlo's monthly share would be \$125.25.

Activity 2

Calculate individual expenses as percents of total expenses.

1. Food = \$120/week = \$480/month

   $$\frac{\$480}{\$2040} \times 100\% = 23.53\%$$

   Gas, oil = \$60/month

   $$\frac{\$60}{\$2040} \times 100\% = 2.94\%$$

   Clothing = \$500/year = \$41.66/month

   $$\frac{\$41.66}{\$2020} \times 100\% = 2.04\%$$

Donations = \$5.00/week = \$20/month

$$\frac{\$20}{\$2040} \times 100\% = .98\%$$

Car maintenance = \$600/year = \$50/month

$$\frac{\$50}{\$2040} \times 100\% = 2.45\%$$

Entertainment = \$30/month

$$\frac{\$30}{\$2040} \times 100\% = 1.47\%$$

2. Monthly net income is $\frac{37\,440}{12} = \$3120.$

Item	Percent of Budget	Monthly Budget
Rent	24.0%	**\$ 748.80**
Food	22.0%	**\$ 686.40**
Utilities	4.0%	**\$ 124.80**
Transportation	6.5%	**\$ 202.80**
Clothing	4.8%	**\$ 149.76**
Recreation	3.5%	**\$ 109.20**
Personal expenses	3.5%	**\$ 109.20**
Vacation	6.5%	**\$ 202.80**
Savings	20.0%	**\$ 624.00**
Insurance	5.2%	**\$ 162.24**
Total	100.0%	**\$3120.00**

Activity 3

Set up and balance a budget.

1.

Increases		Cuts	
Food	\$100.00	Pocket money	\$ 60.00
Gas, oil	\$ 15.00	Dining out	\$138.00
Commuting	\$ 32.00	Rent	\$ 60.00
Tuition \$2950/12 =	\$245.83	Electricity	\$ 30.00
		Heating	\$ 25.00
Total	\$392.83	Water, garbage, sewer	\$ 30.00
		Furniture	\$ 56.00
		Renter's insurance = \$86/12	\$ 7.17
		Total	\$406.17

Difference = \$406.17 – \$392.83 = \$13.34

After cuts had been made, they found that they cut too much. To make the expenditure balance the income exactly, they add \$13.34 to the "pocket money" category which had been reduced to \$70.00.

The new budget is shown.

Budget Sheet

Name: Graham and Catherine Oumet Date:

Fixed Monthly Expenses		Variable Monthly Expenses	
Rent or Mortgage	$460.00	Food	$350.00
Car payment	120.00	Household:	
Instalment payments		Electricity	——
Furniture	——	Heating fuel	——
Appliances	——	Telephone	18.00
	——	Water, garbage, sewer	——
Savings	200.00	Other	——
Emergency fund	40.00	Transportation:	
		Gas, oil	80.00
Total	$820.00	Parking	36.00
Annual Expenses		Commuting	32.00
		Other	——
Property tax	——	Personal Spending:	
Car insurance	$410.00	Clothing	45.00
Life insurance	32.00	Newspaper/magazine	12.33
Renter's insurance	——	Pocket money	83.34
License plates	32.00	Gifts, contributions	19.00
Other	2950.00	Entertainment:	
		Movie/theatre	12.00
Total	3424.00	Sports events	10.00
		Recreation	17.00
Reserved monthly		Dining out	——
(divided by 12)	$285.33	Miscellaneous	——
		Total	$714.67

Monthly Spending Plan	
Net Income	$1820.00
Expenses:	
Fixed expenses	820.00
Annual expenses	285.33
Variable expenses	714.67
Total Monthly Expenses	$1820.00
Balance	$ 0

Extra Help

1. Step 1: Set up the proportion.

$$\frac{\text{expenses}}{\text{net income}} = \frac{r}{100}$$

$$\frac{\$28\,900}{\$35\,600} = \frac{r}{100}$$

Step 2: Cross multiply. $\$35\,600r = \$28\,900 \times 100$

Step 3: Divide by 35 600. $\$35\,600r = \$2\,890\,000$

$$r = \frac{\$2\,890\,000}{\$35\,600}$$

$$r = 81.2\%$$

The Mullings' family expenses came to 81.2% of the yearly income.

Exploring Topic 2

Activity 1

Calculate and compare unit prices of similar items.

1. Price per litre $= \frac{\$5.20}{4} = \$1.30$

2. Price per millilitre $= \frac{\$12.00}{0.3} = \$40.00$

3. Price per donut $= \frac{\$3.60}{18} = \$0.20$

Activity 2

Calculate the sale price given the regular price and the discount (percent or fraction).

1. Discount $= \$55.00 \times 25\%$

$$= \$55.00 \times \frac{25}{100} = \$13.75$$

The discount is \$13.75.

Sale price = \$55.00 – \$13.75
= \$41.25

The sale price is \$41.25, and Judy saves \$13.75.

2. Discount $= \$25.20 \times \frac{1}{3} = \$8.40$

Sale price $= \$25.20 - \$8.40$
$= \$16.80$

The sale price is \$16.80.

3. Shelf price per item $= \frac{\$0.98}{3} = \$0.33$

Sale price per item $= \frac{\$1.68}{5} = \$0.336 = \$0.34$

Therefore, the sale is not a bargain.

4. Discount = \$13.50 – \$10.20 = \$3.30
The discount is \$3.30.

Activity 3

Calculate the rate of discount given the regular price and the sale price.

1. $\frac{3}{8} = 0.375 = 37.5\%$

2. Discount = \$180.00 – \$15.00 = \$3.00

Rate of discount $= \frac{\$3}{\$18} \times 100\% = \frac{300}{18}\% = 16.66\%$

The rate of discount is 16.66%.

3. Discount = 60¢ = \$0.60
Regular price = \$1.80 + \$0.60 = \$2.40

Discount rate $= \frac{\$0.60}{\$2.40} \times 100\% = 25\%$

The discount rate is 25%.

Activity 4

Calculate the regular price given the sale price and the rate of discount.

1. Sale price = \$88.00
Discount rate = 20%
Sale price = (100% – 20%) of regular price
= 80% of regular price

Regular price $= \frac{\$88}{80\%} = \$88 \div 80\% = \$88 \div \frac{80}{100}$

$$= \$88 \times \frac{100}{80} = \frac{\$8800}{80} = \$110$$

The regular retail price was \$110.00.

2. Sale price = \$180.00

$$\text{Discount rate} = \frac{1}{3} = 0.3333 = 33.33\%$$

$$\text{Sale price} = (100\% - 33.33\%) \text{ of regular price}$$

$$= 66.67\% \text{ of regular price}$$

$$\text{Regular price} = \frac{\$180}{66.67\%} = \frac{\$180}{0.6667} = \$269.99$$

or Sale price $= \frac{2}{3}$ of regular price

$$\text{Regular price} = \$180 \div \tfrac{2}{3} = \$180 \times \tfrac{3}{2} = \$270.00$$

The regular price was \$270.00.

Extra Help

1. $\frac{60}{100} = \frac{N}{\$650}$

$100N = \$650 \times 60$

$100N = \$39\,000$

$N = \$39\,000 \div 100$

$N = \$390$

The goods are priced at **\$390**.

2. The discount is **\$750 – \$525 = \$225**.

$\frac{\$225}{\$750} = \frac{N}{100}$

$\$750N = \$225 \times 100$

$\$750N = \$22\,500$

$N = \$22\,500 \div \$750$

$N = 30$

The discount on the coat was **30%** of the regular price.

Exploring Topic 3

Activity 1

Identify and calculate the rate of provincial sales tax for different provinces and calculate the price of an item including provincial sales tax.

1.

Province	Sales Tax	
	Man's Suit \$120.00	Camera \$540.00
BC	**\$ 7.20**	**\$32.40**
AB	**\$ 0**	**\$ 0**
SK	**\$ 8.40**	**\$37.80**
MB	**\$ 8.40**	**\$37.80**
ON	**\$ 9.60**	**\$43.20**
PQ	**\$10.80**	**\$48.60**
NS	**\$12.00**	**\$54.00**
PEI	**\$12.00**	**\$54.00**
NB	**\$13.20**	**\$59.40**
NF	**\$14.40**	**\$64.80**

2.

VANCOUVER BOOKSTORE, Vancouver, B.C. Date _____			
Quantity	Description	Price	Amount
5	Ballpoint pen	$ 0.37	**$ 1.85**
1	Book	$12.50	**$12.50**
2	Eraser	$ 0.20	**$ 0.40**
1	Art Supplies	$ 7.25	**$ 7.25**
	Subtotal		**$22.00**
	Sales Tax		**$ 1.32**
	Total		**$23.32**

3.

Item	Total Selling Price	Sales Tax
Shoes	$ 46.00	$ 4.14
Sweater	$ 10.00	$ 0
Screwdrivers	$ 3.60	$ 0.32
LP record	$ 9.50	$ 0.86
Total	$ 69.10	$ 5.32

Total price = $69.10 + $5.32

= $74.42

John's purchases totalled $74.42.

Extra Help

1.

Enter	Display
49.99	49.99
×	
.05	0.05
=	2.4995
+	
49.99	49.99
=	52.4895

The shoes would cost $52.49.

2.

Enter	Display
159.99	159.99
×	
.03	0.03
=	4.7997
+	
159.99	159.99
=	164.7897

The suit would cost $164.79.

3.

Enter	Display
29	29
×	
.06	0.06
=	1.74
+	
29	29
=	30.74

The flowers would cost $30.74.

Extensions

Your table should look like this.

Column 1	Sales tax to be added on
$ 0 - 5	$0.30
5.01 - 10	0.90
10.01 - 15	1.50
15.01 - 20	2.10
20.01 - 25	2.70
25.01 - 30	3.30
30.01 - 35	3.90
35.01 - 40	4.50
40.01 - 45	5.10
45.01 - 50	5.70
50.01 - 55	6.30
$55.01 - 60	$ 6.90
60.01 - 65	7.50
65.01 - 70	8.10
70.01 - 75	8.70
75.01 - 80	9.30
80.01 - 85	9.90
85.01 - 90	10.50
90.01 - 95	11.10
95.01 - 100	11.70

Remember to take the middle value of column 1 and multiply it by 0.12 to obtain the amount of sales tax to be added on.

Exploring Topic 4

Activity 1

Identify the benefits and limitations of life insurance.

1. Some benefits of life insurance are as follows:
   - It provides the wife and family with some financial protection in the event of the husband's death.
   - It provides a savings program to have money for future education.
   - It can pay out a mortgage.
   - It can add to a person's retirement income.

2. Some limitations of obtaining life insurance are as follows:
   - There are many life insurance companies, and it makes it difficult, at times, to make a choice.
   - Money for the premiums must be set aside for monthly or yearly payments.
   - Contracts will vary, and you must be sure that the contract is read very carefully.

Activity 2

Identify and compare features of types of life insurance such as term, whole-life, endowment, and group.

This is an individual activity.

Activity 3

Identify factors such as the amount of insurance, age, sex, health, and employment of the person being insured which are used in determining the premium.

1. a. Number of units purchased = \$50 000.00 ÷ \$25 000 = 2
   Annual premium = \$76.75 × 2 = \$153.50
   Total premium for 5 years = \$153.50 × 5 = \$767.50
   New premium = \$107.25 × 2 = \$214.50

   John's premium would be \$214.50.

   b. His beneficiary will receive \$50 000.00.
   Total premium for 3 years = \$153.50 × 3 = \$460.50

   John would have paid \$460.50.

2. Number of units = \$192.50 ÷ \$96.25 = 2
   Face value = \$25 000.00 × 2 = \$50 000.00

   Maxine can buy \$50 000.00 worth of insurance.

3.

	Policy	Age	Sex	Face Value	Premium
a.	Straight-life	23	M	\$ 3000.00	**(\$ 44.67)**
b.	Straight-life	31	F	\$20 000.00	**(\$341.40)**
c.	Straight-life	30	M	**(\$ 3000.00)**	\$ 54.24
d.	20-payment life	18	F	\$ 6000.00	**(\$111.12)**
e.	20-payment life	19	M	\$ 8000.00	**(\$162.00)**
f.	20-payment life	20	F	**(\$ 4000.00)**	\$ 77.48
g.	20-year endowment	26	M	\$10 000.00	**(\$434.00)**
h.	20-year endowment	25	F	\$ 7000.00	**(\$302.82)**
i.	20-year endowment	27	M	**(\$ 5000.00)**	\$217.15

a. \$14.89 × 3 = \$44.67
b. \$17.07 × 20 = \$341.40
c. (\$54.24 ÷ \$18.08) × \$1000.00 = \$3000.00
d. \$18.52 × 6 = \$111.12
e. \$20.25 × 8 = \$162.00
f. (\$77.48 ÷ \$19.37) × \$1000.00 = \$4000.00
g. 43.40 × 10 = \$434.00
h. 43.26 × 7 = \$302.82
i. (\$217.15 ÷ \$43.43) × \$1000.00 = \$5000.00

Activity 4

Identify and examine company projections of life insurance values including dividends, cash-surrender values, and loan amounts which can be borrowed against a policy.

1. At age 35: $9 \times \$129.41 = \$1164.69$
   The cash-surrender value will be \$1164.69.

   In 5 years: $9 \times \$23.13 = \$208.17$
   The cash value will be \$208.17.

2. Number of units: $\$3000.00 \div \$1000.00 = 3$

   Cash-surrender value: $\$245.50 \times 3 = \$736.50$
   The cash-surrender value would be \$736.50.

   Total premium: $\$20.73 \times 3 \times 15 = \$932.85$
   Carl will have paid \$932.85 in 15 years.

3. Number of units = $\$20\,000.00 \div \$1000 = 20$
   Gaylene's premiums are as follows.

   1st premium = $\$43.37 \times 20 = \$867.40$

   2nd premium = $(\$43.37 - \$10.20) \times 20 = \$663.40$

   3rd premium = $(\$43.37 - \$9.56) \times 20 = \$676.20$

   4th premium = $(\$43.37 - \$9.00) \times 20 = \$687.40$

   5th premium = $(\$43.37 - \$11.30) \times 20 = \$641.40$

Extra Help

1.

Kind of Policy	Age at Issue	Face of Policy	Calculation of Premium	Premium
Straight-Life	30	\$7000	$\frac{\$7000}{\$1000} \times \$18.16$	\$127.12
Straight-Life	45	\$5000	$\frac{\$5000}{\$1000} \times \mathbf{\$31.01}$	**\$155.05**
20-Payment Life	20	\$8500	$\frac{\mathbf{\$8500}}{\$1000} \times \mathbf{\$24.90}$	**\$211.65**
20-Year Endowment	25	\$5500	$\frac{\mathbf{\$5500}}{\$1000} \times \mathbf{\$46.16}$	**\$253.88**
20-Year Term	45	\$6000	$\frac{\mathbf{\$6000}}{\mathbf{\$1000}} \times \mathbf{\$14.85}$	**\$ 89.10**

2. Annual premium on a \$5000, 20-year endowment policy at age 20 is

   $$\frac{\$5000}{\$1000} \times \$46.06 = \$230.30.$$

   Annual premium on a \$5000 straight-life policy at age 20 is

   $$\frac{\$5000}{\$1000} \times 13.80 = \$69.00.$$

   The 20-year endowment is \$230.30 – \$69.00 = \$161.30 more.

3. Annual premium paid on a \$5000, 20-year endowment policy at age 40 is

$$\frac{\$5000}{\$1000} \times \$48.08 = \$240.40.$$

The total of the premiums paid in 20 years is $20 \times \$240.40 = \$4808.00$.

The difference is $\$5000 - \$4808 = \$192$.

The amount received was \$192 more than the total premiums paid.

4. Annual premium on a \$10 000 straight-life policy at age 35 is

$$\frac{\$10\,000}{\$1000} \times \$21.42 = \$214.20.$$

The total of the premiums paid in 16 years is $16 \times \$214.20 = \$3427.20$.

The difference is $\$10\,000 - \$3427.20 = \$6572.80$.

The beneficiary received \$6572.80 more than had been paid in premiums.

Extensions

1.

Face of Policy	Annual Rate	Calculation of Annual Premium	Annual Premium (to the nearest cent)
\$ 9000	\$0.39	$\frac{\$9000}{\$100} \times 0.39$	**\$35.10**
\$12 000	\$0.56	$\frac{\$12\,000}{\$100} \times \$0.56$	**\$67.20**
\$22 000	\$0.45	$\frac{\$22\,000}{\$100} \times \$0.45$	**\$99.00**
\$61 000	\$0.37	$\frac{\$61\,000}{\$100} \times \$0.37$	**\$225.70**

2. Let N represent the face value of the policy.

$$\frac{80}{100} = \frac{N}{\$42\,000}$$

$$100N = 80 \times \$42\,000$$

$$100N = \$3\,360\,000$$

$$N = \$3\,360\,000 \div 100$$

$$N = \$33\,600$$

The face value of the policy is \$33 600.

$$\text{Annual premium} = \frac{\$33\,600}{\$100} \times \$0.51 = \$171.36.$$

The amount of the annual premium is \$171.36.

N.L.C. - B.N.C.
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Mathematics 24

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